

**REMARKS**

The specification has been amended following the translation of the application from German to English. Claims 1-25 have been amended. Claim 1-25 remain for further consideration. No new matter has been added.

The objections and rejections shall be taken up in the order presented in the Official Action.

2. The drawings currently stand objected to for failing to comply with 37 C.F.R. 1.84(p)(4) because reference character “5” has been used to designate both a “proton-permeable layer” and “membrane-electrode unit”.

The specification has been amended.

3-4. The specification currently stands objected.

The specification has been amended.

5-6. Claim 5 currently stands rejected under 35 U.S.C. §112, second paragraph.

Claim 5 has been amended.

8. Claims 1-2, 4-5, 13-16 and 24 currently stand rejected under 35 U.S.C. §102(b) for allegedly being anticipated by U.S. Patent App. No. 2002/0098399 to Keppeler (hereinafter “Keppeler”).

### **Claim 1**

As amended, claim 1 recites an integrated fuel cell and integrated circuit device, which includes:

“a semiconductor substrate;  
a fuel cell, located on the semiconductor substrate and comprising  
 a first electrode and a second electrode configured to define a reaction region, where one of the first and the second electrodes is a cathode and the other is an anode;  
 a layer that is permeable at least to protons and is configured to permit catalytic activity, the layer positioned between the first electrode and the second electrode;  
 a fuel delivery device configured to provide fuel, the fuel delivery device positioned on a side of the first electrode; and  
 a reactant delivery device configured to provide a reactant, where the reactant reacts with protons from the fuel to generate current, the reactant delivery device positioned on the side of the second electrode;  
 where the fuel is integrated into the material of at least one of the first electrode and an adjacent layer.” (emphasis added, cl. 1).

Keppeler discloses a fuel cell for use in powering a motor vehicle. A 35 U.S.C. §102(b) rejection requires a single prior art reference that discloses each feature of the claimed invention. Keppeler is incapable of anticipating claim 1 because it fails to disclose an integrated fuel cell and integrated circuit device, which includes a semiconductor substrate and a fuel cell located on the semiconductor substrate.

**Claim 14**

As amended, claim 14 recites an integrated fuel cell and integrated circuit device, which includes:

“a semiconductor substrate;  
a fuel cell, located on the semiconductor substrate and comprising  
 a first electrode and a second electrode configured to define a reaction region, where one of the first and the second electrodes is a cathode and the other is an anode;  
 a layer that is permeable at least to protons and is configured to permit catalytic activity, the layer positioned between the first electrode and the second electrode;  
 a fuel delivery device configured to provide fuel, the fuel delivery device positioned on a side of the first electrode; and  
 a reactant delivery device configured to provide a reactant, where the reactant reacts with protons from the fuel to generate current, the reactant delivery positioned on the side of the second electrode;  
 where the reactant for generating a quantity of current is integrated into the material of at least one of the second electrode and an adjacent layer;  
 where only reactant from the reactant delivery device can react with the fuel.” (emphasis added, cl. 14).

Keppeler discloses a fuel cell for use in powering a motor vehicle. A 35 U.S.C. §102(b) rejection requires a single prior art reference that discloses each feature of the claimed invention. Keppeler is incapable of anticipating claim 14 because it fails to disclose an integrated fuel cell and integrated circuit, which includes a semiconductor substrate and a fuel cell located on the semiconductor substrate.

**Claim 24**

As amended, claim 24 recites a method for manufacturing an integrated fuel cell and integrated circuit device. The method includes:

“depositing a proton-permeable layer between a first electrode and a second electrode, the proton-permeable layer configured to permit catalytic activity;

depositing a reactant delivery device as an integral part of one of the electrodes; and  
 treating a material of the reactant delivery device with reactant.”  
 (emphasis added, cl. 24)

Keppeler discloses a fuel cell for use in powering a motor vehicle. A 35 U.S.C. §102(b) rejection requires a single prior art reference that discloses each feature of the claimed invention. Keppeler is incapable of anticipating claim 24 because it fails to disclose an integrated fuel cell and integrated circuit formed by depositing a proton-permeable layer as claimed and depositing a reactant delivery device as claimed.

**11.** Claims 3 and 8-10 currently stand rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over Keppeler in view of U.S. Patent No. 3,338,746 to Plust et al. (hereinafter “Plust”).

It is respectfully submitted that this rejection of claims 3 and 8-10 is now moot since independent claim 1 is patentable for at least the reasons set forth above.

**12.** Claim 11 currently stands rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over Keppeler in view of U.S. Patent App. No. 2002/0168560 to Murkerjee et al. (hereinafter “Murkerjee”).

It is respectfully submitted that this rejection of claim 11 is now moot since independent claim 1 is patentable for at least the reasons set forth above.

13. Claim 12 currently stands rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over Keppeler in view of U.S. Patent No. 6,057,051 to Uchida et al. (hereinafter “Uchida”).

It is respectfully submitted that this rejection of claim 12 is now moot since independent claim 1 is patentable for at least the reasons set forth above.

14. Claims 1, 6-7, 14 and 17 currently stand rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over U.S. Patent App. No. 2003/0003347 to D’Arrigo et al. (hereinafter “D’Arrigo”) in view of Keppeler.

#### **Claim 1**

Claim 1 has been amended as set forth above.

The Official Action correctly states that “*D’Arrigo does not expressly teach that fuel (H<sub>2</sub>) is integrated into the material of one of the electrodes formed as the fuel delivery device and/or of a layer adjacent to it.*” (pg 9, paragraph 5). However, the Official Action contends that “*Keppeler, discussed above, teaches a fuel cell with an anode space containing a hydride-forming and or hydrogen-storing compound (or substance)....*” (pg 9, paragraph 6). The Applicants respectfully disagree with this characterization of the Keppeler reference.

Keppeler teaches that “*a hydrogen-containing gas is supplied via the feeding pipe 5 into the anode space 2. Oxygen contained in the air is supplied to the cathode space 3 as the oxidant, via the feeding pipe 6.*” (paragraph 24, emphasis added). Keppeler does not define either *anode space* or *cathode space* within the specification. Therefore, the terms *anode space* and *cathode space* are to be interpreted according to their plain and ordinary meanings. Space is defined as “a place available for a particular purpose.” (Dictionary.com, “space”). Thus, according to a fair

and proper reading of Keppeler, the hydrogen-containing gas is supplied into a space that contains an anode and the oxygen is supplied to a space that contains a cathode, where the purpose of the “space” is to provide set bounds for the anode and the cathode.

A skilled person would not modify the system of D’Arrigo based upon the teachings of Keppeler. D’Arrigo relates to a micro silicon fuel cell, whereas Keppeler discloses a fuel cell for use in a motor vehicle as a drive source. If D’Arrigo was modified to include the anode space as disclosed in Keppeler, then the resultant device would no longer work for the intended purpose of D’Arrigo, since the resultant device would no longer be capable of being located on a silicon chip. Combining the dissimilar teachings of D’Arrigo and Keppeler would not result in a predictable outcome because the teaching of Keppeler has no reasonable relationship to semiconductor devices, in more particularly, to fuel cell devices to be integrated into a silicon semiconductor as recited in claim 1.

#### **Claim 14**

It is respectfully submitted that claim 14 is patentable for at least the same reasons as set forth above with respect to claim 1.

#### **Claims 6-7 and 17**

It is respectfully submitted that this rejection is moot since independent claims 1 and 14 are patentable for at least the reasons set forth above.

**15.** Claims 18-20 currently stand rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over D'Arrigo in view of Keppeler and in further view of Plust et al.

It is respectfully submitted that this rejection of claims 3 and 8-10 is now moot since independent claim 14 is patentable for at least the reasons set forth above.

**16.** Claim 21 currently stands rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over D'Arrigo in view of Keppeler and in further view of Murkerjee et al.

It is respectfully submitted that this rejection is now moot since independent claim 14 is patentable for at least the reasons set forth above.

**17.** Claim 22 currently stands rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over D'Arrigo in view of Keppeler and in further view of Uchida et al.

It is respectfully submitted that this rejection is now moot since independent claim 14 is patentable for at least the reasons set forth above.

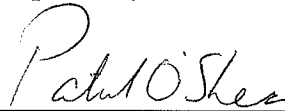
**18.** Claims 23 and 25 currently stand rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over D'Arrigo, Keppeler and Murkerjee et al, in further view of U.S. Patent No. 4,164,172 to Anderten et al. (hereinafter "Anderten").

It is respectfully submitted that this rejection of claims 23 and 25 is now moot since independent claim 14 is patentable for at least the reasons set forth above.

For all the foregoing reasons, reconsideration and allowance of claims 1-25 is respectfully requested.

If a telephone interview could assist in the prosecution of this application, please call the undersigned attorney.

Respectfully submitted,

A handwritten signature in cursive script, reading "Patrick J. O'Shea". The signature is written in dark ink and is positioned above a horizontal line.

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